

## RoboMon NT/2000 - SQL Server Intelligent Solution Set

Automated management for Microsoft® SQL Server™ 6.5 and 7.0

### Manage Any SQL Server Environment Better

RoboMon's SQL Server Intelligent Solution Set provides easily configurable proactive monitoring and problem solving for any size SQL Server environment, from small business servers to the multi-processor clusters necessary for global eBusiness. RoboMon's automated, out-of-the-box SQL Server Intelligent Solution Set operates through an integrated set of rules that detect and correct problems before your users experience failures or slowdowns. It monitors all aspects of SQL Server availability and performance, including:

- Basic operations, such whether crucial services are running,
- Performance criteria, such as CPU, I/O and memory,
- Storage criteria, such as free disk space, database size and log file size, and
- Criteria specific to each version of SQL Server, such as unsafe auto-parameterization attempts in SQL Server 7.

RoboMon can diagnose and correct problems on the spot, or escalate them to your attention at a central monitoring location. Performance and event data are archived to help you evaluate your hardware and software needs, and to plan realistically for growth.

### Key Benefits

- Works out of the box, with no setup time
- Configures to any size SQL Server environment
- Fixes problems automatically, focuses your staff's time on the issues you target
- Allows centralized monitoring of remote systems
- May be precisely customized for each environment
- Provides intuitive, graphical interface for management and customization
- Integrates with RoboMon's enterprise-wide total eBusiness infrastructure management solution (see below)



### What RoboMon's SQL Server Intelligent Solution Set Monitors

RoboMon's SQL Server Intelligent Solution Set provides comprehensive monitoring and management of running SQL Server systems. Specific rules are designed to:

- Check basic performance indicators such as CPU, I/O, memory usage
- Raise an alert if any of the SQL Server processes use too much CPU
- Raise an alert when processes are blocked and provide detailed information about the processes that are blocking them
- Warn when user connections are approaching the server's maximum
- Report connections that have failed because the server's maximum number of connections has been reached
- Raise an alert when limited database size prevents further allocation of space
- Monitor amount of free space in each database (and, in 6.5, each device and table), raising an alert before lack of space causes the database to go offline, or for SQL Server to shut down entirely
- Monitor transaction logs and warn when they exceed specified thresholds

### RoboMon NT/2000 Event Monitor

The screenshot shows the RoboMon Event Monitor interface. At the top, it says "Robomon Event Monitor - All Events for RoboMon Event Database on \\BASE". Below that is a menu bar (File, Monitor, View, Event, Detail, Tools, Help) and a toolbar with various icons. A message bar reads "Open problems for Enterprise".

EventDateTime	Class	SubClass	Computer	!	!	RuleName
10/28/99 04:02:58 PM	SQL7 SERVE...	BUFFER CACHE	VAULT	⊗	!	SQL7_BUFFER_CACHE_EFFICIE
10/28/99 04:00:18 PM	AUTOMATION	NETWORK	EAST	⊗	!	UNREACHABLE_COMPUTERS
10/28/99 04:00:18 PM	AUTOMATION	NETWORK	EAST	⊗	!	UNREACHABLE_COMPUTERS
10/28/99 02:01:32 PM	IIS	IIS CACHE	GLOBAL	⊗	!	IIS_CACHE_ALERT
10/28/99 02:01:28 PM	IIS	IIS PROCESS	GLOBAL	⊗	!	IIS_PROCESS_POOL_LEAK
10/27/99 11:00:09 PM	AUTOMATION	PAGE_FILE	EAST	⊗	!	PAGE_FILE_LOAD
10/27/99 11:00:01 PM	IIS	IIS SERVICES	EAST	⊗	!	IIS_SERVICES

Below the table, a detailed view of an event is shown:

```

Updated severity 1 problem for computer VAULT at 10/28/99 04:02:58 PM.
Generated by rule SQL7_BUFFER_CACHE_EFFICIENCY of type BUFFER CACHE in SQL SERVER 7.

SQL Server 7 is experiencing low buffer cache efficiency.

The buffer cache hit ratio is low at 86.4 percent. This can
result in a high disk read/write rate, thereby negatively impacting
performance.

Buffer cache hit ratio : 86.4 percent
Cache size : 64 MB
Total server memory : 255 MB
Server memory free : 59.63 percent
Page read rate : 2.1 reads/second
Page write rate : 1.4 reads/second
    
```

At the bottom of the window, it shows "Ready", "7 events", and "10/28/99 4:15:26 PM".

## What RoboMon's SQL Server Intelligent Solution Set Monitors cont.

- Monitor the efficiency of the data cache, warning of low cache hit ratios that may indicate a need for more physical memory on the server, or for more to be allocated to SQL Server
- Track I/O errors
- Warn when there are not enough system locks to complete the current command
- Raise an alert when errors are detected that may indicate database corruption
- Collect and report errors and warnings from the SQL Server error log
- Monitor the rate of data throughput based on batch requests, providing information necessary for performance tuning

In addition, the solution sets have rules specific to versions 6.5 and 7:

### SQL Server 7:

- Report service dependencies and identify when crucial services are not running
- Track the number of SQL Server 7 databases on each server and warn when this changes
- Warn of excessive database growth and raise an alert when total database growth exceeds a specified threshold
- Report low free space on writeable hard disks, helping to prevent file fragmentation, application failure, transaction rollback, cancellation of maintenance functions, and ultimately the failure of SQL Server 7 due to lack of space
- Monitor the amount of memory being used by SQL Server 7, and raise an alert when memory used exceeds a specified percentage of the target memory, preventing degradation of SQL Server performance
- Monitor used workspace memory, warning when it drops below a specified threshold, which may degrade server performance
- Monitor number of pending memory grants, identifying bottlenecks that will degrade server performance
- Check for high replication latency
- Identify excessive recompile rates that may indicate insufficient physical memory on the server
- Detect excessive numbers of deadlocks resulting in rollback of transactions
- Warn of unsafe auto-parameterization attempts, indicating the possible need to increase or enhance available server-side stored procedures

### SQL Server 6.5:

- On start-up evaluate whether the amount of memory allocated to SQL Server is correctly configured
- Monitor CPU usage, I/O, memory usage, and number of locks held by each individual user

- Warn when the percentage of space used in the tempdb is high
- Track the number of warnings generated when the Open Objects parameter is exceeded, identifying the need to reconfigure this parameter
- Track SQL Server packet errors
- Check for high number of transactions to be replicated, and high replication rate
- Report when total number of SQL Server locks is approaching the maximum

## What Rules Mean to You

RoboMon rules work out-of-the-box, with no tweaking, for any size SQL Server configuration. In addition, each RoboMon rule may be completely customized, allowing precise control over threshold settings through the Solutions Manager, as well as actions to be taken, required notifications and alerts.

RoboMon's intuitive, graphical Rule Designer allows you to tailor rules and create new rules without writing a single line of code. Customized rules may be deployed to individual machines, domains or throughout the enterprise, via simple, efficient, drag & drop operations in the RoboMon Enterprise Manager.

## The Total RoboMon Solution

RoboMon for Windows NT/2000 is automated eBusiness infrastructure management software that detects and corrects complex application, system and network problems to ensure the highest levels of availability and performance.

RoboMon includes a suite of pre-defined rules, called Intelligent Solution Sets, that work out of the box to detect and correct problems with applications, systems and networks, including Windows NT/2000, Microsoft BackOffice, and SNMP-based network components.

RoboMon may be configured to notify staff of problems in real time, or to take corrective action independently and monitor the results for success. RoboMon's many notification options include paging, e-mail, SNMP trap, net send messages, and centralized event reporting through the Event Monitor, enabling it to integrate with and supplement your current staff notification practices.

## Where RoboMon's SQL Server Intelligent Solution Set Gets Its Data

- Perfmon counter
- Win32 API
- SQL Server API
- ASCII log files
- NT event log

## RoboMon's SQL Server Rules

### SQL Server 7 Rules:

#### Allocate\_Space\_Failed

Creates a problem event indicating how many times error 1105 is found during the interval.

#### Blocked\_Processes\_Alert

Raises an alert if there are any blocked SQL Server 7 processes on the server.

#### Blocked\_Processes\_Details

Provides detailed information about blocked SQL Server 7 processes.

#### Connection\_Failed

Creates a problem event indicating how many times error 17809 is found during the interval.

#### Connections\_High

Monitors if SQL Server 7 is close to using the maximum number of connections.

#### Corrupted\_Database

Creates a problem event indicating how many times error 605 is found during the interval.

#### Data\_Throughput

Monitors the rate of data throughput by monitoring the rate of batch requests.

#### Database\_Growth

Monitors SQL Server 7 database files (\*.mdf) for growth.

#### Databases\_Present

Monitors the list of SQL Server 7 databases present on the server, and raises an alert if the list changes.

#### Deadlock\_Alert

Creates a problem event indicating how many times error 1205 is found during the interval.

#### Errors\_Detected

Creates a message for each error in the SQL Server error log.

#### Full\_Databases

Monitors discovered databases for the amount of free space remaining in the database.

#### Full\_Logs

Monitors the transaction logs associated with the databases hosted on the server and raises an alert if they exceed the maximum percentage used as defined in the RoboMon Solutions Manager.

#### Generate\_DB\_Used\_SQL

Dynamically generates a SQL batch file to generate statistics for the amount of space used in each database detected. The SQL code is based on the code used for the system stored procedure sp\_spaceused, located in the SQL Server 7 Enterprise Manager under "Stored Procedures" for the master database.

#### Generate\_DB\_Used\_Statistics

Through the OSQL utility, creates the file from which the SQL7\_DB\_USED domain retrieves its statistics from the SQL batch file created by the Generate\_DB\_Used\_SQL.

#### Insufficient\_Locks

Creates a problem event indicating how many times error 1204 is found during the interval.

#### Log\_Growth

Monitors SQL Server 7 log files (\*.ldf) for growth.

#### Replication\_Latency

Checks if the replication latency is slow.

#### Server\_Memory

Monitors the memory used by SQL Server 7 in relation to the maximum amount available to SQL Server 7.

#### Set\_SQL7\_Errorlog

Determines if SQL Server 7 is running, and sets a variable containing the full path name of the SQL Server 7 error log.

#### SQL7\_Buffer\_Cache\_Efficiency

Checks the efficiency of the SQL Server 7 data cache by examining the cache hit ratio.

#### SQL7\_Disks

Reports low free space on writeable hard disks.

#### SQL7\_IO\_Errors

Monitors SQL Server 7 for IO errors.

#### SQL7\_Performance\_Checks

Checks some basic performance indicators.

#### SQL7\_Process\_Busy

Checks if any of the SQL Server 7 processes are using too much CPU.

#### SQL7\_Process\_CPU

Monitors the CPU utilization by individual processes within SQL Server 7, generating a problem event if any process exceeds the threshold set in the RoboMon Solutions Manager.

#### SQL7\_Recompiles

Monitors the rate of SQL recompiles.

#### SQL7\_Services

Checks for SQL Server services auto-started, but not running.

#### SQL7\_Transaction\_Log\_Full

Checks if any transaction logs are almost full.

#### Total\_Database\_Growth

Monitors the total growth of SQL Server 7 database files (\*.mdf), raising an alert if the file grows by more than the threshold percentage defined in the RoboMon Solutions Manager.

#### Total\_Log\_Growth

Monitors the total growth of SQL Server 7 log files (\*.ldf), raising an alert if the file grows by more than the threshold percentage defined in the RoboMon Solutions Manager.

#### Unsafe\_Auto\_Params

Monitors the number of unsafe auto-parameterization attempts.

#### Warnings\_Detected

Creates a message for each warning in the SQL Server error log.

#### Workspace\_Memory

Monitors the amount of used workspace memory as a percentage of total available workspace memory.

#### Workspace\_Memory\_Grants

Monitors the number of pending memory grants.

## RoboMon's SQL Server Rules cont.

### SQL Server 6.5 Rules

#### Blocked\_Processes

Checks for processes that are blocked or are blocking other processes.

#### Cant\_Allocate\_Space

Creates a problem event indicating how many times error 1105 is found during the interval.

#### Check\_Tempdb\_Used

Checks the percentage of tempdb used.

#### Data\_Cache\_Efficiency

Checks the efficiency of the SQL Server data cache by examining the cache hit ratio.

#### Database\_Corrupted

Creates a problem event indicating how many times error 605 is found during the interval.

#### Databases\_Almost\_Full

Checks if any database is too full, based on percentage of used space.

#### Devices\_Almost\_Full

Checks if any database device is too full, based on the percentage of used space.

#### Errors\_In\_Log

Creates a message for each error in the the SQL Server error log.

#### IO\_Errors

Checks if there have been any SQL Server I/O errors.

#### IO\_Load

Checks if either number of Transact-SQL command batches or number of physical page reads per second is too high.

#### Not\_Enough\_Locks

Creates a problem event indicating how many times error 1204 is found during the interval.

#### Open\_Objects\_Param\_Low

Creates a problem event indicating how many times the "OPEN OBJECTS parameter may be too low" warning is found during the interval.

#### Packet\_Errors

Checks if there have been any SQL Server packet errors.

#### Replication\_Latency\_Slow

Checks if the replication latency is slow.

#### Replication\_Trans\_Rate\_High

Checks if the rate of transaction replication is high.

#### Replication\_Transactions\_High

Checks if the number of transactions to be replicated is high.

#### SQL\_Server\_Memory

Reports, at start-up, whether the amount of memory allocated to SQL Server is correctly configured or not.

#### SQL\_Server\_Performance\_Checks

Checks some basic performance indicators.

#### SQL\_Server\_Process\_Busy

Checks if any SQL Server process is using too much CPU.

#### SQL\_Server\_Service\_Not\_Running

Checks for SQL Server services auto-started, but not running.

#### Tables\_Almost\_Full

Checks if any table is too full, based on percentage of used space.

#### Too\_Many\_Locks

Checks if the total number of SQL Server locks is approaching the maximum.

#### Too\_Many\_User\_Connections

Checks if number of user connections is approaching maximum.

#### Transaction\_Log\_Full

Checks if any transaction logs are almost full.

#### Unable\_To\_Connect

Creates a problem event indicating how many times error 17809 is found during the interval.

#### Unable\_To\_Connect\_Count

Counts the number of times error 17809 is found in the error log. This count is used in the Unable\_To\_Connect rule.

#### User\_CPU\_Load

Checks if any SQL Server user is using too much CPU time in the interval.

#### User\_IO\_Load

Checks if any user is performing too much I/O during interval.

#### User\_Locks

Checks if any SQL Server user is holding too many locks.

#### User\_Memory

Checks if any SQL Server user is using too much memory.

#### Warnings\_In\_Log

Creates a message for each warning in SQL Server error log.



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